

# Engineering Model Panchromatic Fourier Transform Spectrometer (PanFTS) Instrument for the GEO-CAPE Mission

Completed Technology Project (2011 - 2014)



## Project Introduction

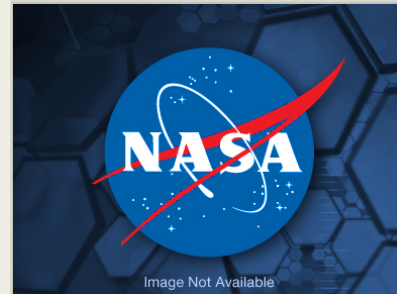
The Panchromatic Fourier Transform Spectrometer (PanFTS) is an imaging spectrometer that can measure pollutants, greenhouse gases, and aerosols as called for in the Decadal Survey and the NASA Science Plan. With continuous spectral coverage from the near-ultraviolet through the thermal infrared, PanFTS is designed to meet all of the science requirements for the NASA GEO-CAPE mission.

The objective of this IIP is to advance the PanFTS TRL from 4 to 6. The first TRL advancement is to build and operate a flight size PanFTS engineering model (EM) that addresses all critical scaling issues and demonstrates operation over the full spectral range of the flight instrument (0.26  $\mu\text{m}$  to 15  $\mu\text{m}$ ). The second technology advancement is to make simultaneous UV-Vis and IR measurements under space flight like environmental conditions (thermal-vacuum at 180 K). This will demonstrate that critical design requirements have been achieved such as optical alignment stability, interferometer modulation efficiency, and low instrument background emission in the IR. This is essential to reduce flight instrument development risk and show that the most vital element of the PanFTS, the interferometer design, is mature and ready to be implemented in a flight instrument.

The three year development of a PanFTS EM will build on the many successful PanFTS breadboard IIP developments which have the characteristics required for the EM including the instrument architecture for panspectral measurement, the high precision, long life, cryogenic optical path difference mechanism (OPDM) and the high-speed, high precision digital output FPAs. All of these advanced technologies from the PanFTS breadboard will be incorporated into the EM along with other ESTO funded technology developments. The EM will tie together several component technologies in a system level instrument capability demonstration to meet the objectives of the IIP and the measurement capability requirements for the NASA Earth Science community.

## Anticipated Benefits

Candidate instrument for the Earth Science Decadal Survey mission "Geostationary Coastal and Air Pollution Events (GEO-CAPE)"



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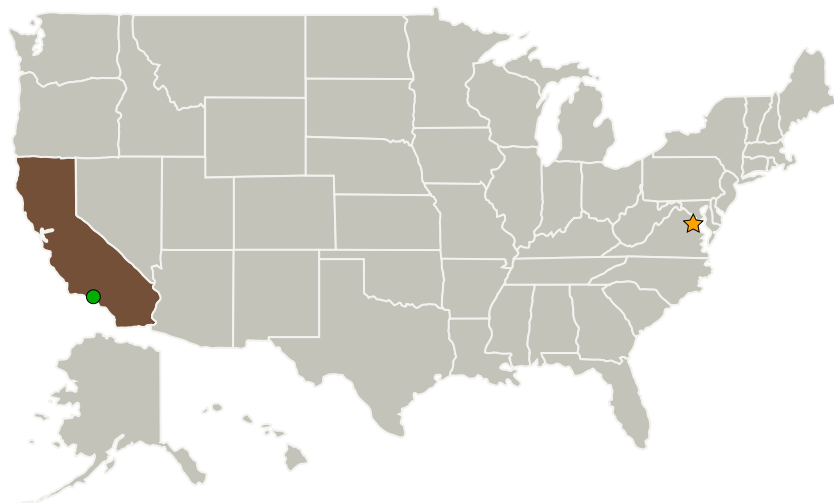
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## Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ NASA Headquarters(HQ)	Lead Organization	NASA Center	Washington, District of Columbia
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

### Primary U.S. Work Locations

California

## Stories

Untitled

(<https://techport.nasa.gov/file/24315>)

## Organizational Responsibility

### Responsible Mission Directorate:

Science Mission Directorate (SMD)

### Lead Center / Facility:

NASA Headquarters (HQ)

### Responsible Program:

Earth Science

## Project Management

### Program Director:

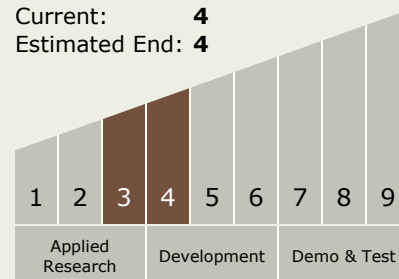
George J Komar

### Principal Investigator:

Stanley P Sander

## Technology Maturity (TRL)

Start: 3  
Current: 4  
Estimated End: 4



## Technology Areas

### Primary:

*Continued on following page.*

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## Technology Areas (cont.)

- TX08 Sensors and Instruments
  - └ TX08.1 Remote Sensing Instruments/Sensors
    - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

## Target Destination

Earth